

WHAT IS CLAIMED IS:

1 1. An isolated, substantially pure, or recombinant protein preparation of
2 a human telomerase reverse transcriptase (hTERT) protein, or a variant thereof, or a fragment
3 thereof.

1 2. An isolated, synthetic, substantially pure, or recombinant
2 polynucleotide that is at least ten nucleotides to 3kb in length and comprises a contiguous
3 sequence of at least ten nucleotides that is identical or exactly complementary to a contiguous
4 sequence encoding a recombinant protein of claim 1.

1 3. The polynucleotide of claim 2 that encodes an hTERT protein or
2 fragment.

1 4. A method of identifying a compound that modulates hTERT activity,
2 said method comprising the steps of contacting an hTERT protein of claim 1 with said
3 compound and measuring a change in a property or activity of said hTERT, wherein a
4 statistically significant change in said property or activity identifies said compound as a
5 modulator of hTERT activity.

1 5. The method of claim 4 wherein the compound is an inhibitor of hTERT
2 activity.

1 6. A method of preparing recombinant telomerase, said method
2 comprising contacting a recombinant hTERT protein of claim 1 with a telomerase RNA
3 component under conditions such that said recombinant protein and said telomerase RNA
4 component associate to form a telomerase enzyme capable of catalyzing the addition of
5 nucleotides to a telomerase substrate.

1 7. The method of claim 6, wherein the hTERT protein has a sequence of
2 Figure 17.

1 8. The method of claim 7, wherein the hTERT protein is produced in an *in*
2 *vitro* expression system.

1 9. The method of claim 6, wherein a said hTERT protein is substantially
2 purified before said contacting.

1 10. A method for increasing the proliferative capacity of a vertebrate cell
2 by introducing a recombinant hTERT polynucleotide of claim 3 into the cell, and wherein said
3 sequence is operably linked to a promoter.

1 11. A method of detecting the presence of at least one telomerase positive
2 human cell in a biological sample comprising human cells, said method comprising the steps:

3 a) measuring the amount of an hTERT gene product in said
4 sample,

5 b) comparing the amount measured with a control correlating
6 to a sample lacking telomerase positive cells,

7 wherein the presence of a higher level of the hTERT gene product in said
8 sample as compared to said control is correlated with the presence of telomerase positive cells
9 in the biological sample.

1 12. The method of claim 11, wherein said telomerase positive cells are
2 cancer cells.

1 13. The method of claim 11, wherein the amount of an hTERT gene
2 product is measured using an antibody.

1 14. The method of claim 11, wherein the amount of an hTERT gene
2 product is measured using a nucleotide probe.

1 15. The method of claim 11, wherein said detecting involves diagnosing a
2 telomerase-related condition in a patient, and said method further comprises the steps of:

3 a) obtaining a cell or tissue sample from the patient;

4 b) measuring the amount of an hTERT gene product in the cell
5 or tissue; and,

6 c) comparing the amount of hTERT gene product in the cell or
7 tissue with the amount in a healthy cell or tissue of the same type;
8 wherein a different amount of hTERT gene product in the sample from
9 the patient and the healthy cell or tissue is diagnostic of a telomerase-related condition.

1 16. The method of claim 15 wherein the amount is higher in said sample
2 than in said healthy cell or tissue and said telomerase-related condition is cancer.

1 17. A method for treatment of a condition associated with an elevated
2 level of telomerase activity within a cell, comprising introducing into said cell a
3 therapeutically effective amount of an inhibitor of said telomerase activity, wherein said
4 inhibitor is an hTERT polypeptide, an antibody that binds hTERT, or an hTERT polynucleotide.

1 18. The method of claim 17, wherein the inhibitor is an oligonucleotide
2 comprising the sequence of Figure 17 or a subsequence or variant thereof.

1 19. The method of claim 18, wherein the oligonucleotide comprises
2 nonstandard or derivatized bases or linkages between bases.

1 20. The method of claim 17, wherein the inhibitor is a polynucleotide that inhibits binding
2 of endogenous hTERT to hTR.